



Chinese Universities: Supporting a New Knowledge Economy

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My Background

- Higher education and education policy researcher
- One-year full time experience in Peking University Founder Group (1st generation of University-run)
- Constant observation from the frontline of the university and the related entrepreneurial activities

Mirage: How true is the reality?



Brocken Inaglory (2007)

Indicators of China's potential in NKE

- The Global Competitiveness Report (WEF):
 - GCI: 29/148 (Efficiency driven)

12th pillar: Innovation

12.01	Capacity for innovation.....	4.2	30
12.02	Quality of scientific research institutions	4.3	41
12.03	Company spending on R&D.....	4.2	22
12.04	University-industry collaboration in R&D	4.4	33
12.05	Gov't procurement of advanced tech products	4.4	13
12.06	Availability of scientists and engineers	4.5	44
12.07	PCT patents, applications/million pop.*	9.2	36

Stage of development

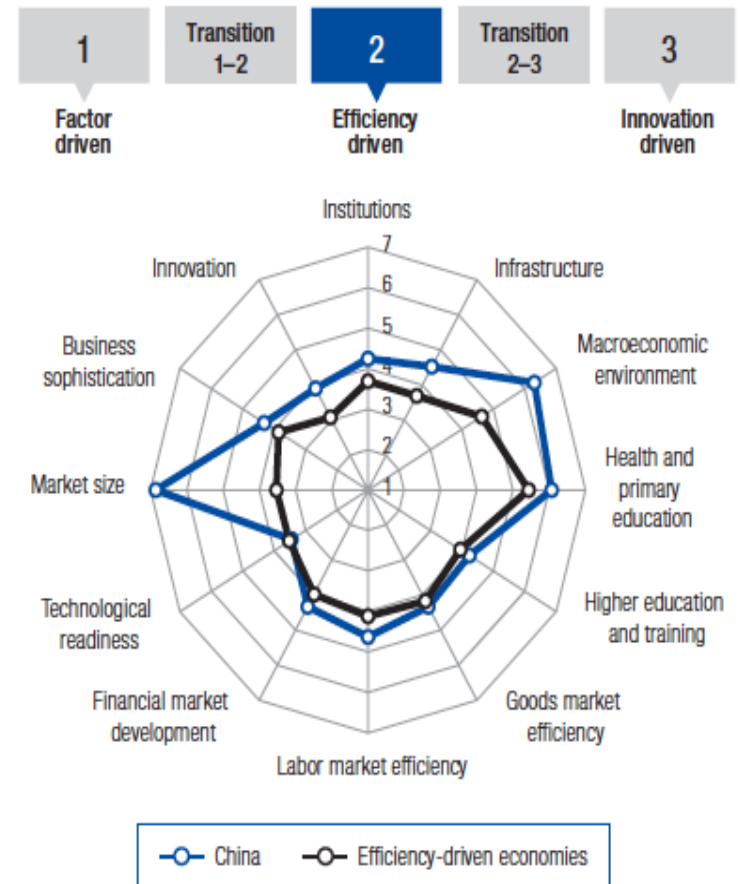
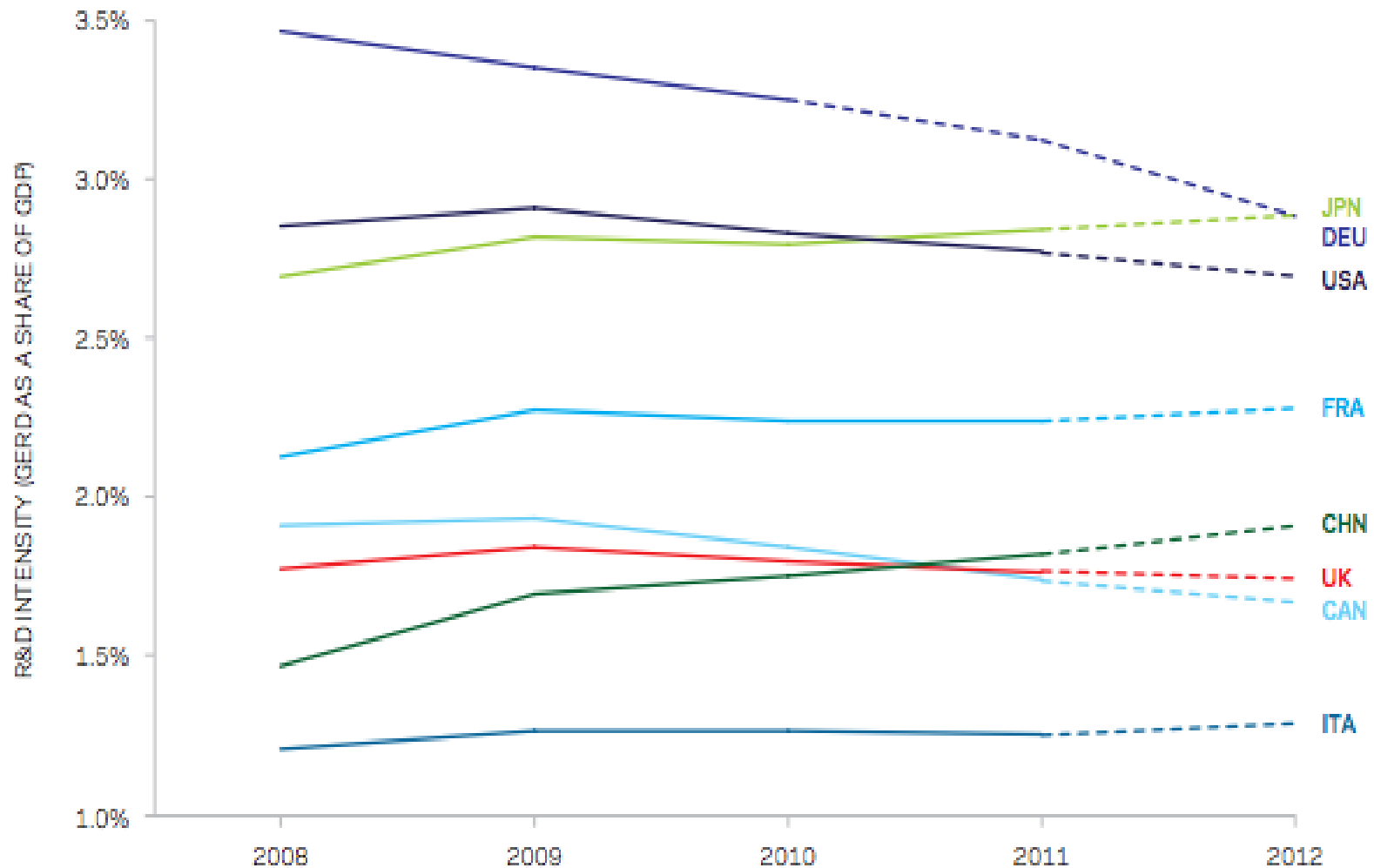
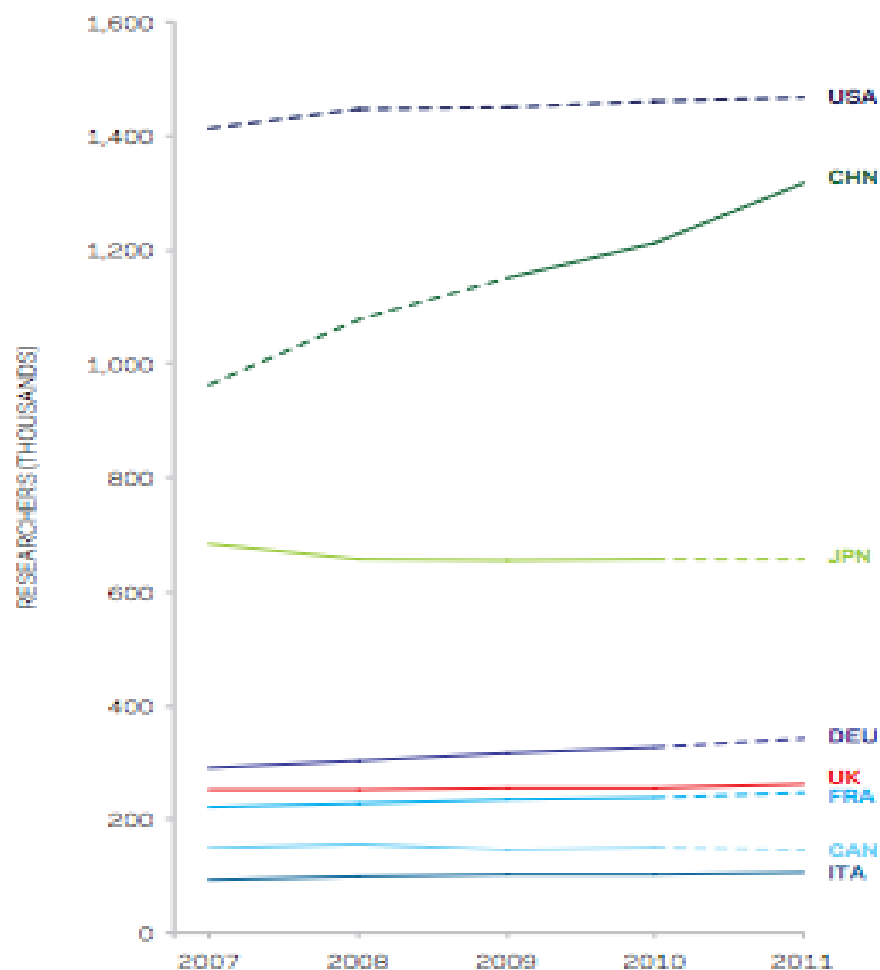


Figure 2.2 — R&D intensity (GERD as a share of GDP) for UK and comparators, 2008-12. All 2012 values (and also 2011 for Japan) are extrapolated from OECD data. UK ranking in EU27 is amongst 20 (of 27) countries with available data and in OECD is amongst 38 (of 41) countries with available data. Source: OECD MSTI 2013/1.



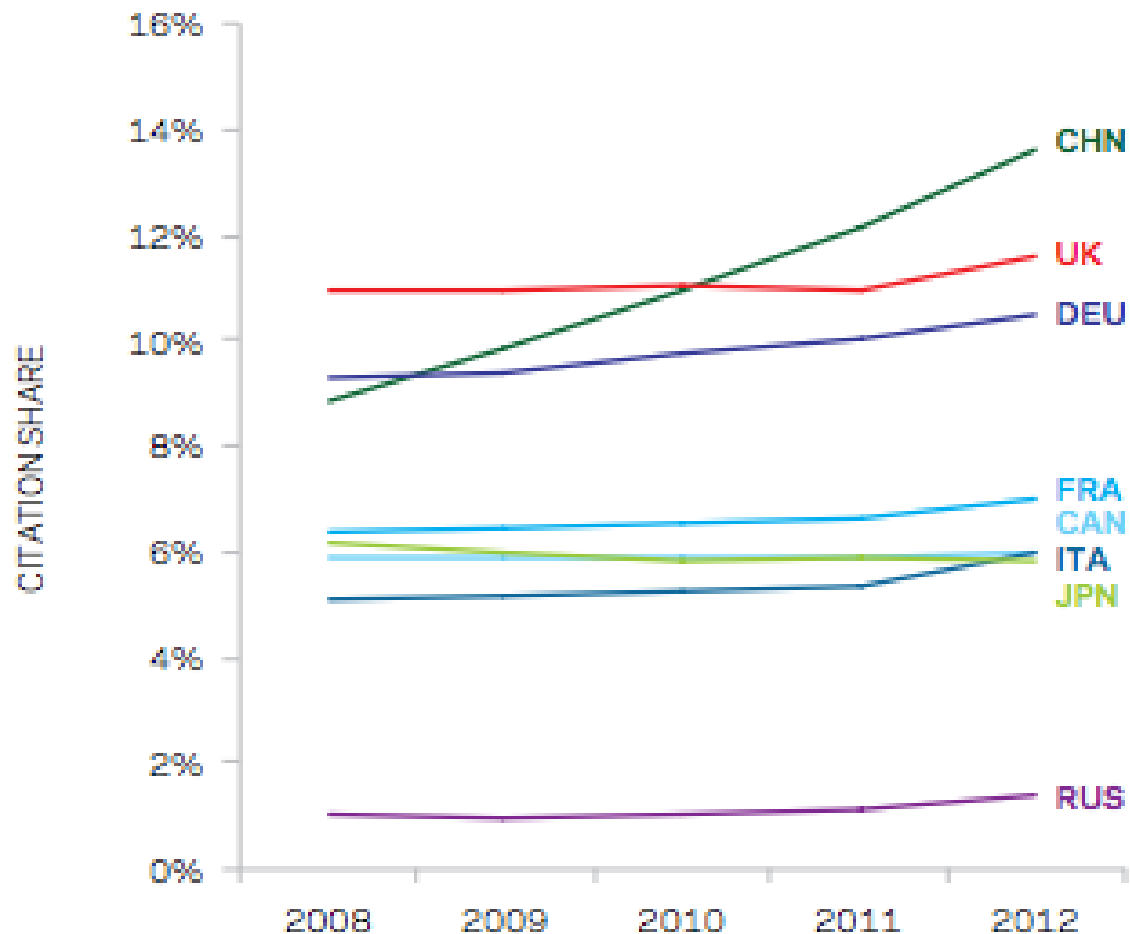
Source: from Elsevier (2013)

Figure 3.1 — Researchers for the UK and comparators, 2007-11. All 2011 values (except Italy, UK and China) are extrapolated from OECD data; for the US, all values except 2007 are extrapolated from OECD data. Note that data for China were rebased in 2009 according to the Frascati Manual definition of “researcher”; prior to this, much of the data for China were collected according to the United Nations Educational, Scientific and Cultural Organization (UNESCO) concept of “scientist and engineer”; the researcher count for 2008 was estimated from the 2009 value by applying the average percentage increase from the 2009-11 data, and then the 2008 count was estimated by the percentage increase from the original 2008-09 data. World totals are based on the 40 countries with available data, and represent the majority of research-intensive countries globally. UK ranking in the EU27 is amongst 22 (of 27) countries with available data, in the OECD is amongst 37 (of 41) countries with available data, and for the World is amongst 40 countries with available data. Source: OECD MSTI 2013/1.



Source: from Elsevier (2013)

Figure 4.4 — Share of world citations for the UK and comparators, 2008-2012 with right-hand panel excluding the US for clarity. The share for '2008' is comprised of citations in the period 2008-12 to articles published in 2008, while for '2012' it is comprised of citations in the period 2012 to articles published in 2012. Source: Scopus.



Source: from Elsevier (2013)

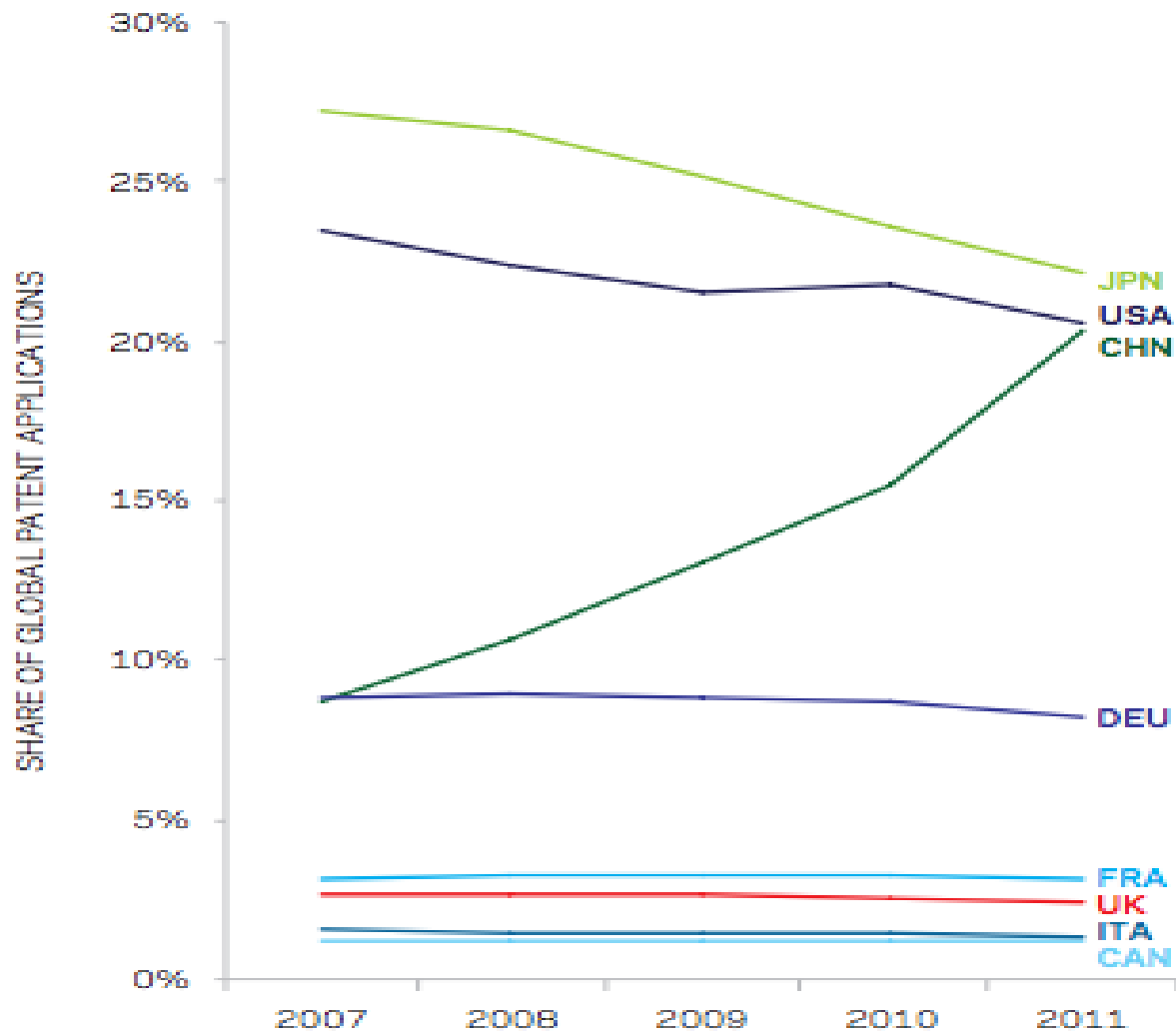
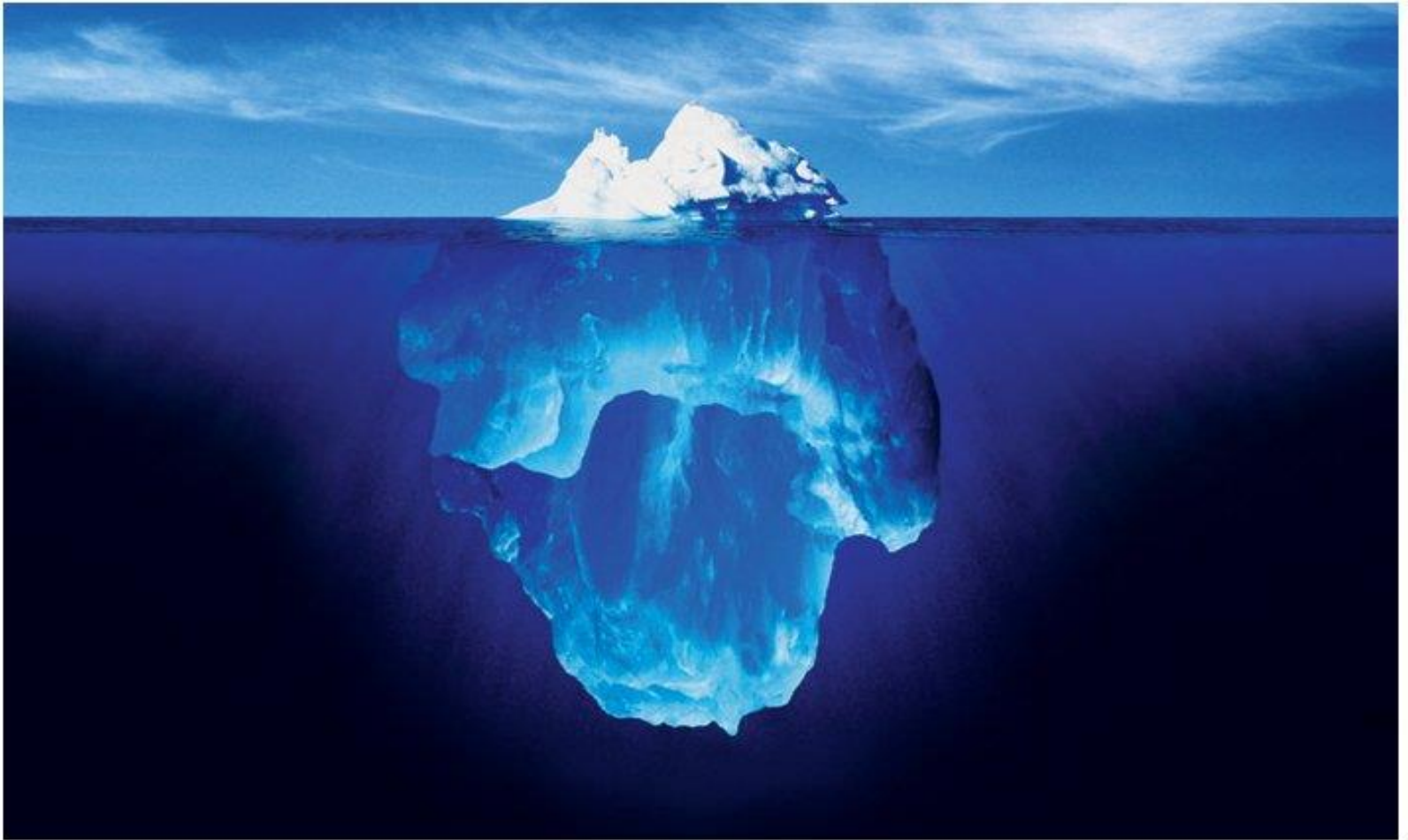


Figure 7.4 — Share of global patent applications for UK and comparators, 2007-2011. Source: WIPO Statistics Database (March 2013).

Source: from Elsevier (2013)

1/8 vs. 7/8 and turbulence flow



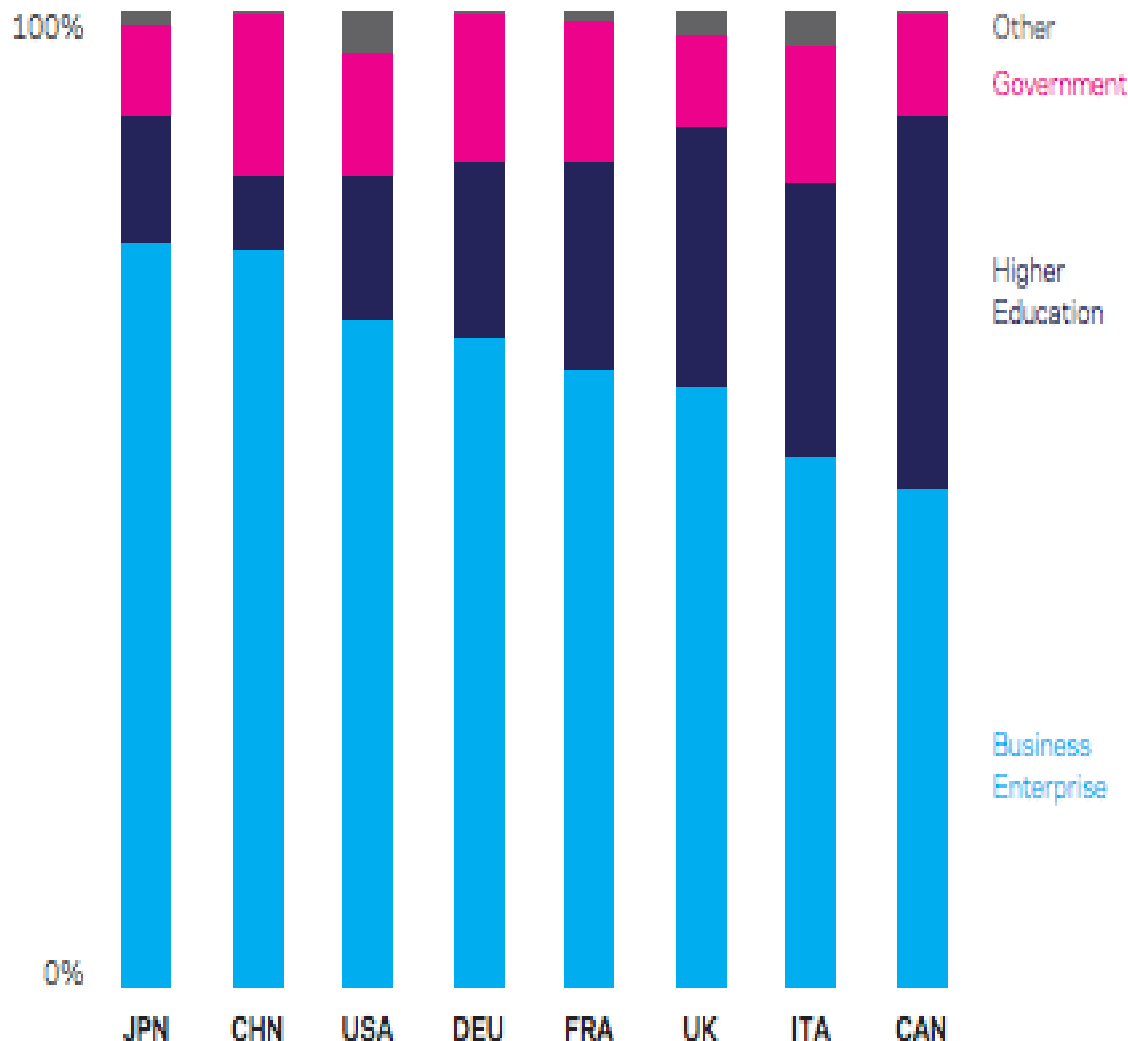


Figure 2.3 — R&D expenditure by sector of research-performance for the UK and comparators, 2011. Data are shown for 2011 as this is the most recent year for which data are available for the majority of countries. For Japan, no 2011 values were available so 2010 data were used. For all countries, 'Other' was estimated by (subtraction) from the total. Countries are shown left to right by descending proportion of Business Enterprise as the sector of research-performance.

Source: OECD MSTI 2013/1.

Chinese university's roles in reality

- Weak basic research (Sun & Cao, 2014; Chen, 2012): 4.8% of R&D expenditure (2008); 4.7% (2013)
- Smallest share of national R&D expenditure held by the higher education sector: 8.5% (2008), 7.2% (2013)
- By the knowledge fields: engineering and science have the largest share of students, teachers and outputs.

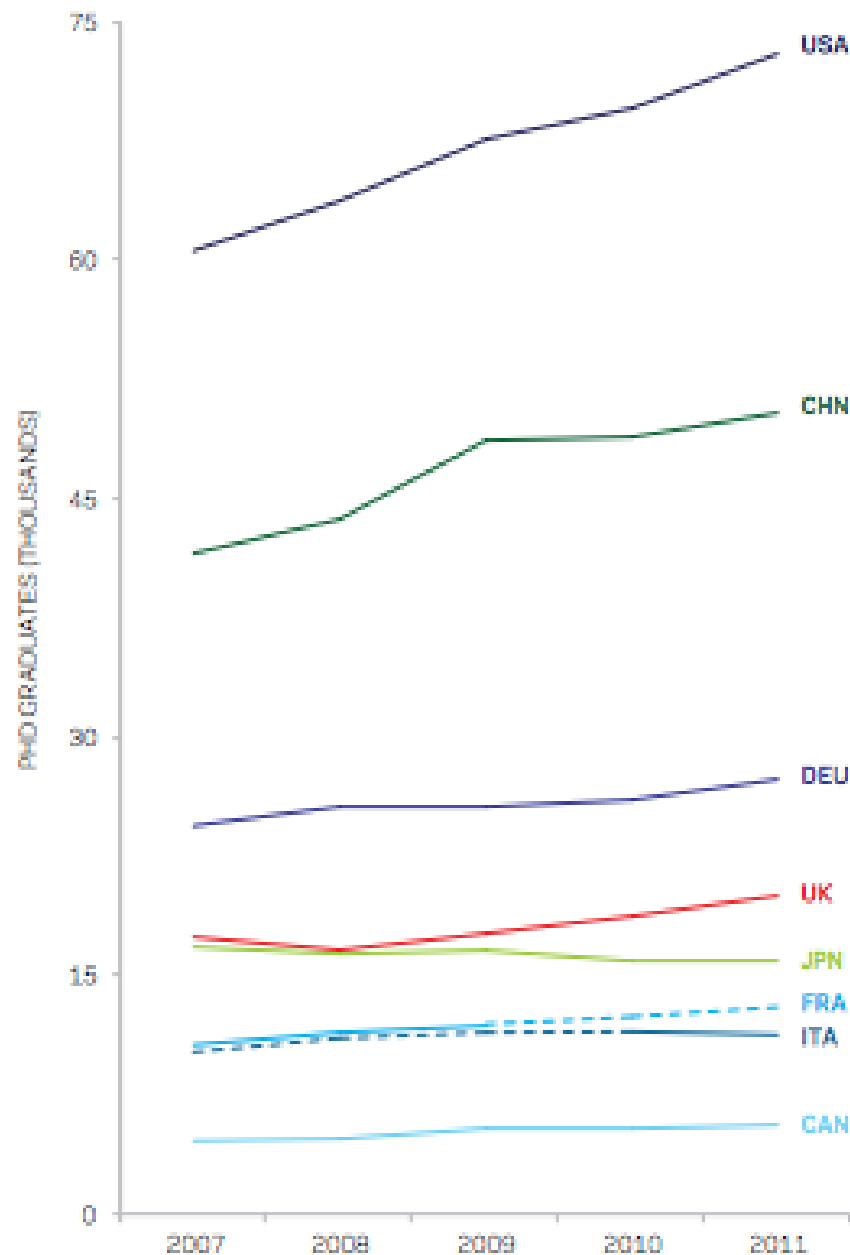
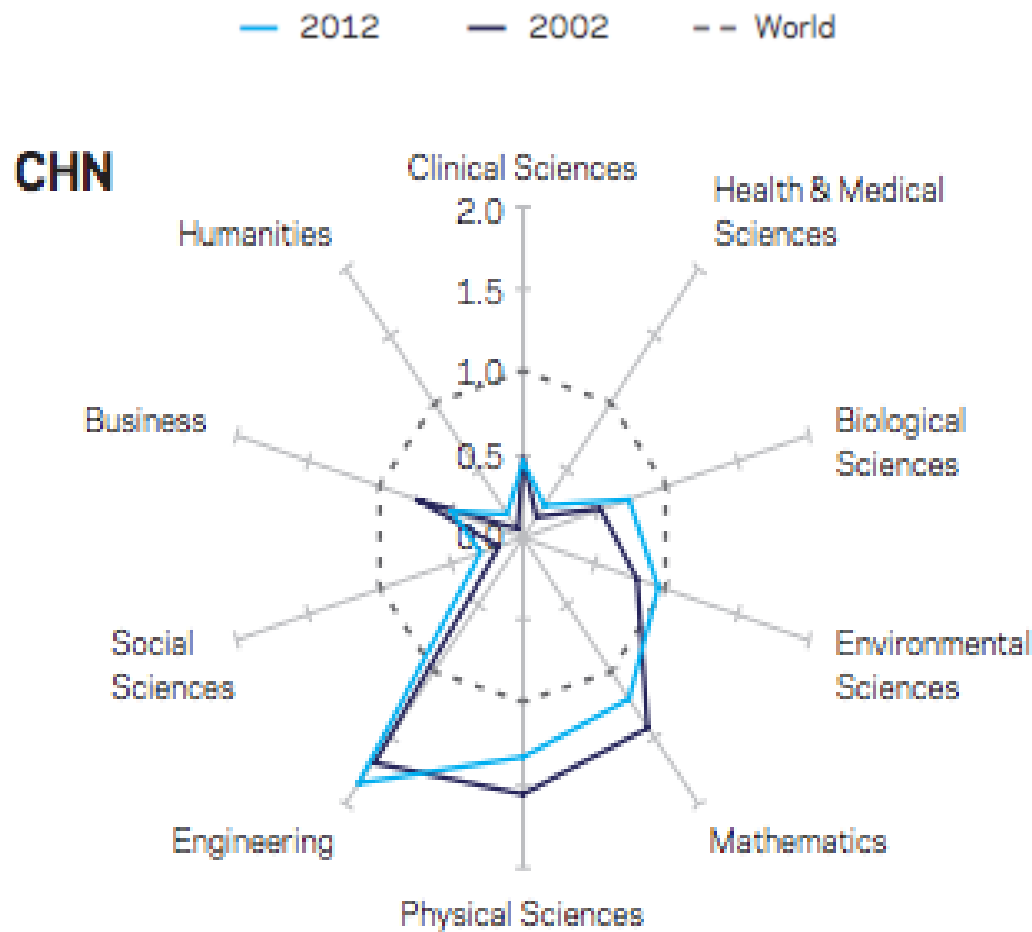


Figure 3.3 — PhD graduates for the UK and comparators, 2007-2011. Values for 2010 and 2011 for France and 2008, 2009 and 2010 for Italy are extrapolated from OECD data. Note that comparable figures for China are not available in OECD data; these values are from China's Ministry of Education¹⁵. Source: OECD MSTI 2013/1 and China Ministry of Education.

Source: from Elsevier (2013)

Figure 4.3 — Activity Index for the UK and comparators (also Brazil, India and Russia) across ten research fields in 2002 and 2012. For all research fields, an Activity Index of 1.0 equals world average share in that particular research field. For Humanities, the baseline is defined with respect to OECD countries rather than to the world²⁷. Note that the axis maximum has been increased for Italy and Russia (to 2.5) and for Brazil (to 3.0). Source: Scopus.



Source: from Elsevier (2013)

Dead or active volcano?



What university-business cooperation in China shall imply?

- Look beyond the indicators and look into substantial activities and enabling or hindering mechanisms
- Era of UB cooperation 2.0 in China: from university-run enterprise to university-networked innovation base
- Chinese universities as catalysts in the national and global entrepreneurial ecosystem supported by the top-down state policies and the bottom-up initiatives from the market



University to capitalize the state policy

- Innovation as a national buzz word in economic, political, and social lives.
- ‘Plan 2011’ after Project 211 and Project 985 to support selected ‘collaborative innovation centers 2011’
 - which shall cooperate with scientific research institutes, industrial enterprises, local governments and foreign scientific research organizations
 - to promote innovations in knowledge frontier, culture, region and industry
 - 14 centers in 2013 + 24 in 2014

University to nurture entrepreneurship

- Establish informal and formal curricula
- Establish centers supporting student entrepreneurship through business plan competition, 'challenge cups', university science parks and 'leading University Student Entrepreneurship Project'
- University alumni's initiatives to invest on student entrepreneurship: brain circulation and capital circulation (e.g. 1898 café of Peking University)

Table 2

Comparison between academic engagement and commercialisation.

Variable	Engagement	Commercialisation
Individual determinants		
Male	+	+
Age	o	o
Seniority	+	o
Previous commercialisation experience	o	+
Grants awarded (government)	+	o
Contracts awarded (industry)	+	o
Scientific productivity	+	+
Organisational determinants		
Quality university/department	-	+
Organisational support	o	+
Incentive system	o	o
Organisational commercialisation experience	o	+
Peer effects	o	+
Institutional determinants		
Applied discipline	+	+
Life-science/biotech	o	+
Country-specific regulations/policy	o	+
Impact		
Scientific productivity	o	+
Commercial productivity	o	n/a
Shift towards applied research	o	o
Increased secrecy	o	+
Collaborative behaviour	+	+
Teaching	o	o

Notes: The table reports the effects of independent variables (vertical) on outcome variables (individual-level academic engagement and commercialisation). Commercialisation includes academic entrepreneurship and IP-based technology transfer. Key: (+) Positive effect in at least some studies. (-) Negative effect in at least some studies. (o) ambiguous effect/not enough empirical evidence. (n/a) not applicable.

Source: from Perkmann, et al. (2013)

What implications for cross-region UB cooperation?

- Persistent institutional ‘barriers’ to UB cooperation
- Under utilized manpower (female, young entrepreneurs) in new knowledge economy
- Innovations beyond S&T and cross disciplines: social innovations (BAT as example) to change people’s lives
- Paradoxical leading role of the university: to open up all kinds of boundaries, fertilize boundary-crossing and release the potentials